ORIGINAL ARTICLE

Governing the surgical count through communication interactions: implications for patient safety

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Background: Intermittently, the incidence of retained surgical items after surgery is reported in the healthcare literature, usually in the form of case studies. It is commonly recognised that poor communication practices influence surgical outcomes.

Aim: To explore the power relationships in the communication between nurses and surgeons that affect the conduct of the surgical count.

Methods: A qualitative, ethnographic study was undertaken. Data were collected in three operating room departments in metropolitan Melbourne, Australia. 11 operating room nurses who worked as anaesthetic, instrument and circulating nurses were individually observed during their interactions with surgeons, anaesthetists, other nurses and patients. Data were generated through 230 h of participant observation, 11 individual and 4 group interviews, and the keeping of a diary by the first author. A deconstructive analysis was undertaken.

Results: Results are discussed in terms of the discursive practices in which clinicians engaged to govern and control the surgical count. The three major issues presented in this paper are judging, coping with normalisation and establishing priorities.

Conclusions: The findings highlight the power relationships between members of the surgical team and the complexity of striking a balance between organisational policy and professional judgement. Increasing professional accountability may help to deal with the issues of normalisation, whereas greater attention needs to be paid to issues of time management. More sophisticated technological solutions need to be considered to support manual counting techniques.

The surgical count, usually shortened to "the count", is a fundamental practice in the operating room. Its purpose is twofold[1]: to ensure that item such as surgical instruments, sponges and sutures are not retained in the patients' surgical wound, and to ensure that instruments are not accidentally discarded with rubbish and drapes at the end of the procedure, necessitating replacement. Additionally, although not formally recognised in the literature, the surgical count is a method by which student nurses learn the names of instruments.[2]

Professional operating room nursing associations[3–5] provide guidelines and recommendations on how the count should be conducted. In addition, individual operating room departments contextualise these recommendations to meet their own requirements. However, despite being a highly regulated practice, errors in the count procedure occur, sometimes manifesting as retained foreign objects after surgery,[6–12] which are reported in the literature as retrospective case reports.

Although no specific incidents of retained surgical items have been reported as part of current patient safety programmes in the UK[13] the reporting of these sentinel events is mandatory for public hospitals in two Australian states, New South Wales (NSW) and Victoria.[14 15] In Victoria, where this research was undertaken, data showed that in publicly funded hospitals in the period 2003–4, the number of instruments or other items retained after surgery, necessitating re-operation, was nine, whereas in the period 2002–3 the number was eight. The figures for NSW are similar. In Victoria, the main cause of the incidents seemed to stem from poor communication between healthcare practitioners.[14] Despite the importance of communication, previous work has not considered how interactions between nurses and surgeons affect the surgical count in actual practice.

Our study aimed to report on the power relationships in the communication interactions between surgeons and nurses in the operating room as they engage in the practice of the surgical count.

METHODS

The data on which this study is based were collected as part of a larger study examining communication and power relationships between nurses and doctors,[16 17] which took an ethnographic approach.[18 19] Eleven nurses were recruited for their ability to act as key informants[18] about operating room practice and the surgical count. Their characteristics (table 1) were representative of the predominant demographic of Australian nurses.[20] Key informants were closely observed on how they interacted with surgeons, anaesthetists and other nurses, and the interactions were included as data. Follow-up interviews and focus groups about the observations were conducted with the 11 nurses. Patients were also informed about the study before their operation.

Unlike hospitals in the UK, where operating department practitioners form a part of the surgical team,[21] operating rooms in Australia are staffed by three registered nurses who work in the capacity of instrument nurse, circulating nurse and anaesthetic nurse. Instrument nurses "scrub", and prepare and handle sterile equipment for the procedure, remaining at the operating table, whereas circulating nurses remain "unscrubbed" and "scout" on the periphery of the sterile field to retrieve supplies and equipment. Anaesthetic nurses sometimes assist as circulating nurses.

Data were collected sequentially by RR, an experienced operating room nurse, from three different clinical departments: a large metropolitan not-for-profit hospital, an outer suburban public hospital and an inner city publicly funded specialist hospital in Melbourne, Victoria, Australia (table 2).

Table 1 Key informant demographics

Nurse no	Years of nursing experience	Years of operating room experience	Specialty area	Employment status	Hours worked/fortnight	Highest education qualification
1	36	28	Operations manager	Grade 4	76	Bachelor of Education
2	32	16	Instrument/circulating	Clinical nurse specialist	64	Operating Room Nursing Certificate
3	8	7	Anaesthetics/PACU	Grade 3	76	Graduate Certificate (perioperative)
4	5	4	Instrument/circulating	Grade 2	60	Graduate Diploma (perioperative)
5	16	14	Instrument/circulating	Clinical nurse specialist	57	Graduate Certificate (perioperative)
6	1	1	Anaesthetics/PACU	Grade 2	80	Bachelor of Nursing
7	4	3	Anaesthetics/PACU	Grade 2	66	Bachelor of Nursing
8	9	6	Instrument/circulating	Grade 2	80	Bachelor of Nursing
9	28	10	Instrument/circulating	Grade 2	64	Hospital-Based Nurse Training
10	24	20	Instrument/circulating	Clinical nurse specialist	32	Bachelor of Arts
11	30	20	Instrument/circulating	Clinical nurse specialist	63	Bachelor of Nursing

PACU, post-anaesthesia care unit.

Ethical approval was obtained from each hospital and from the university, in accordance with national guidelines in Australia.[22] Pseudonyms were used to protect the identity of all participants and hospitals.

More than 230 h of observational field work of clinical operating room practice was undertaken. Eleven individual, semistructured interviews using the technique of ''photovoice'',[23] [24] and four group interviews with participants from each hospital were conducted. All interviews were audiotaped and data transcribed verbatim. RR also kept a diary for 2 years, in which she recorded observations from the position of an operating room nurse, and interactions with surgeons, anaesthetists and nurses. In this diary, she also recorded and monitored her own and participants' behaviour and attitudes to the research process. This information provided an audit trail for the study, thereby contributing to the credibility of the study findings.

Data collection and analysis were conducted concurrently. Field notes, diary entries and interview transcripts were listened to repeatedly, generating ideas and lines of inquiry that directed further work in the discipline. Rather than performing a thematic analysis, we sought to understand the power relationships and the taken-for-granted assumptions that influenced the surgical count by undertaking a deconstruction of the data.[25] [26] Conducted at two levels, the deconstruction included, firstly, categorising the discursive practices used by nurses in the management of the surgical count. Initially, we asked the question, ''What are the different clinical practices and processes in which operating room nurses engage?'' Through ongoing reflection on the

Table 2 Characteristics of participating hospitals

Institution	Category	Surgical services provided	Specialty areas of surgery	No of operating rooms	No of staff	Average no of operations/ month	Hours of operation
Hospital 1	Private: not-for-profit	Inpatient surgery	General Cardiac Thoracics Orthopaedics Plastics ENT Urology Gynaecology Obstetrics Vascular Neurosurgery	10*	90	1000*	24 h/day, 5 days/ week; 12 h on weekends, with on call for emergencies.
Hospital 2	Public	Inpatient surgery; day surgery; endoscopy	General Orthopaedics Plastics ENT Urology Gynaecology Obstetrics Vascular Neurosurgery Trauma	6	53	800	24 h/day, 7 days/ week.
Hospital 3	Specialist	Inpatient surgery; day surgery; endoscopy	General Orthopaedics Plastics Urology Gynaecology	4	30	22	Monday–Friday; no night duty; on call for emergencies after hours

ENT, ear, nose and throat.
*Denotes level after relocation and expansion of operating room services.

transcribed data from field work, interviews and diary entries, we formulated a tentative framework in which we categorised the different types of practice. Secondly, we formulated theoretical questions based on the work of Michel Foucault,[27–30] to explore how power relationships influenced and governed the conduct of the surgical count. Questions such as "Who exercises power?", "From what subject position are people speaking?" and "How is power exercised?" provided a means of breaking down the practice of nurses to show the influences on their work as they conducted the surgical count. The preliminary analysis was tested by giving written summaries to participants, who were then provided with opportunities for feedback. RR and EM conducted the initial data analysis independently of one another and achieved total agreement.

RESULTS

The count was conducted in a controlled and regulated manner. At the beginning of a surgical procedure, nurses manually counted the number of disposable items, or surgical supplies that could be discarded at the end of the case, and instruments and recorded the tally on a purposely designed "count sheet". Items included on the "set-up", or sterile instruments and supplies prepared on a trolley by the nurse or added during the procedure were progressively added to the tally. During closure of the incisions and at the end of the procedure, nurses manually tallied and crosschecked the number of items on the sheet with the number of items on the sterile set-up. Items listed at the top of the count sheet were counted first, working down the list until all items were accounted for. The count was conducted in the same order before, during and after the operation every time. However, despite being a highly disciplined and controlled practice, as detailed in professional nursing organisation policy,[3–5] and although individual hospital policies had precise details about how to deal with institutional variations in the conduct of the count, forms of power became evident when observing and talking with nurses, which shaped and controlled the practice.

In the next section, we describe the different discursive practices that shaped and affected the surgical count, including judging, coping with normalisation and establishing priorities.

Judging

Not every hospital policy stipulated that all instruments and supplies must be counted for every surgical procedure. Nurses tended to rely on each another if they were unsure about whether it was necessary to conduct a full count of instruments and disposables, rather than referring directly to the written policy. Nor did they refer such concerns to the surgeon completing the surgical procedure. According to the following extract from field notes:

> …in the set-up room Wendy did the count with the instrument nurse. The case was an ORIF [open reduction & internal fixation] tibial plateau. Wendy [circulating nurse] and the instrument nurse counted Raytec, packs, atraumatic needles, diathermy tips and other various disposable equipment. She then asked the instrument nurse, "do you want to count instruments?", to which the instrument nurse replies [replied] "no, the incision will not be that long" (indicating with her hands how long the cut would be). Wendy said "OK".

Nurses tended to use their professional judgement in procedures with small incisions, in which it was deemed that losing an instrument would be physically impossible. They drew on their scientific knowledge of procedures, the anatomical size and length of the incision, and whether intraoperative imaging was being used, to inform their judgement about when the counting of instruments was necessary. Nurses also tested each other's willingness to comply with hospital policy by asking questions such as "Do you want to do a second count?" or "Do you want to count the instruments with me or can I do them?" or "Have you got all your arteries (artery forceps)?" The perceived attitudes of nurses was that some of their colleagues were sticklers and acted to "police" their colleagues' practice, whereas others were more flexible. Still again, nurses used discretionary judgement to selectively make decisions about when to enforce a strict interpretation of the hospital policy, scrutinising the practice of inexperienced nurses more closely than that of more experienced colleagues. Surgeons seemed to be unaware of the latitude that nurses afforded themselves when conducting the surgical count.

Coping with normalisation

Nurses drew on their personal and professional ethics to discipline themselves and others when performing the count. As already mentioned, some nurses were known by their colleagues to strictly adhere to hospital policy, pedantically enforcing the count procedure. For others, normative practice was a source of concern. Nurses who worked in the same area on a daily basis used the same instrument trays repeatedly and were able to recite the contents of the trays from memory. Outsiders—those who did not regularly work in a specialty area of surgery, such as cardiac or neurosurgery—created tension and conflict with nursing colleagues by questioning taken-for-granted practices, as was obvious in the following extract from field notes, recorded in the diary of RR after working as a circulating nurse in a cardiac operating room:

> [The cardiac operating room nurses] know the instruments on the trays off by heart as they use the same ones all the time, so they think that they don't have to count them with the circ nurse—"don't you trust me" or "I know what's on them—it's all here", or "I haven't lost my memory yet". If you insist on counting the instruments there is a lot of huffing and puffing and they [surgeons and other nurses] get annoyed—you're made to feel a nuisance and that you don't quite fit in. This happened to me today. Michelle [the instrument nurse] didn't want to count her instruments aloud when setting up, but I asked her to check the trays with me—which she did in a half-hearted sort of fashion. It wasn't to my satisfaction, but I let it slide. I was dreading having to confront her for the "out" count at the end of the case as I knew that she would object, but I knew I had to stick fast. Luckily I did not have to do the count "out".

For inexperienced nurses or those working in an unfamiliar area of surgery, the tension created between nurses when trying to strictly enforce the count was particularly evident. The technical skill required to perform the count, the need to visualise the instruments and surgical supplies on the sterile set-up, refer to the count sheet to determine the correct number and at the same time write the number on the sheet, was demanding for the beginning practitioner. Some believed that they lacked the speed necessary to manage the count well, equating speed with skill, a sign of efficiency and something to be desired in instrument or circulating nurses. Inexperienced nurses felt frustrated by their lack of technical knowledge about the names of individual instruments and were reluctant to declare their knowledge deficits by

challenging more experienced colleagues for fear of being ostracised and labelled as inefficient.

Establishing priorities

The practice of the count was moderated by the surgeons' power, which directly a how nurses were able to function. In these instances, the use of time was often an issue, as was evident in the following episode from field notes:

> The [surgical] assistant left just before he [surgeon] started closing. This left Alex, the instrument nurse, to assist. There was quite a bit to count—she had two trolleys of instruments and a Mayo stand [instrument trolley]. Now she had to help the surgeon by holding a retractor in one hand and following the suture with the other—she had both hands tied up. We had done a preliminary count of the packs about 10 minutes prior to this, and when it was time to do a final count [this conversation between her and the surgeon followed] she said to the surgeon:
>
> Alex: I am meant to do a count now.
>
> Surgeon: Well I'm not going to stop while you do it. Just do the packs, you can leave the rest.
>
> Alex gave me [RR] 'a look' which I took to mean 'what can I do?' She continued to assist the surgeon and the abdomen was closed before she was free to do a full count. The patient had left the operation room before we had finished the count.

Surgeons sometimes expected nurses to assume two roles: those of the instrument nurse and of the surgical assistant. In these instances, the role of the instrument nurse, with the responsibility of undertaking a count at certain stages of the surgical procedure, could be considered to be of secondary importance to the need for surgical assistance. Nurses often felt unable to demand to undertake the count in the face of the power exercised by surgeons, even though the count was a crucial safeguard for the outcome of the surgery.

In emergency, life-threatening situations nurses made decisions about the priority of the count as shown in the following interview excerpt:

> If you're under the pump [pressured] the count is secondary to getting sutures tied, stopping bleeding, suction, visibility; the count is quite secondary… how can you stay accountable to your count when it's not your priority?

In the initial stages of an emergency, or when something unexpected happened during surgery that required the total attention of the instrument nurse, the patients' physiological stability was paramount and the count was of minor importance. In such cases, instrument nurses relied heavily on the circulating nurses, who "flicked" items onto the sterile set-up and recorded them on the count sheet without verification of a number from the instrument nurse. Accordingly, in using their scientific knowledge of surgery in emergency cases, nurses felt individually authorised to bypass organisational and legal requirements.

DISCUSSION

Previous studies in operating rooms practice have classified the types of errors [31] and communication failures[32] that contribute to adverse events. This study adds another layer of complexity by examining the power relationships in the communication between nurses and surgeons, and among nurses, that could possibly result in errors of the surgical count.

The operating room is an environment of precision and standardisation, and this level of exactness needs to be reflected in the practice of the surgical count. Despite being highly controlled and regulated by professional nursing organisations[3–5] and hospital policies, count practices varied among the three different institutions, and disparities existed in how guidelines were interpreted and applied. In one institution, all instruments and disposable items were counted for every procedure, whereas in another, instruments were counted for only selected procedures. Misinterpretation of policy was also an issue, particularly when two procedures were being conducted on the same patient, which necessitated two separate instrument set-ups. Furthermore, dynamic social relationships of power and control surrounded the surgical count and affected how it was performed. These power relationships were not limited to the traditional, hierarchical nurse–doctor relationships, but also included hierarchical nurse–nurse interactions between experienced and inexperienced nurses.

In subtle ways, experienced nurses selectively adapted their counting technique to the demands of the surgical procedure, using their professional judgement to inform and shape the conduct of the count. Most commonly, for experienced nurses, the exercise of judgement required the selective adaption of the standardised count procedure to meet the demands and nature of the surgery. In addition, professional judgement included adapting the count according to the perceived skill level of colleagues. Here, with experienced nurses, an element of trust was involved,[33] and concerned familiarity and knowledge of a colleague's expected competence. Clearly, striking a balance between standardisation of procedures in policy and allowing professionals to use their own judgement,[33] to avoid rule-based and knowledge-based errors,[31] is difficult to attain.

Counting became a normalised, taken-for-granted practice in which repetitive routines could be devalued. Possibly, the practice of counting every instrument and disposable item for every case regardless of incision size, as was the policy in one hospital, acted to desensitise nurses and surgeons to the importance of the counting process. Rather than relying on a blanket policy of counting everything for all cases, which may act to induce normalisation and complacency, count policies need to be risk-related and appropriate for the size of the incision and type of surgery.

Formally acknowledging the correctness of the count, by the signing of the count sheet, was the dual responsibility of the instrument and circulating nurses, not the surgeon. No provision was made on the count sheet for surgeons' signatures. This dual responsibility could have diluted the responsibility of individual nurses, with each tending to rely on the other, without either taking full responsibility for the task. Much like the single checking of drugs, which has been shown to enhance the autonomy and individual responsibility of nurses without compromising patient safety,[34 35] the signing of the count sheet by only the instrument nurse, rather than the two nurses, may act to increase individual accountability for the count procedure and ensure greater diligence in the practice.

On a broad level, both surgeons and nurses valued speed and efficiency in operating rooms. Apart from organisational priorities about efficiencies and maximising the use of time, surgeons and nurses recognise that the shorter the amount of time patients are under anaesthetic and their open body cavity or wound is exposed to the environment, the safer the procedure is deemed to be. Despite this, the use of time was a common source of conflict among team members.[16] Arguably, speed and efficiency could be in direct conflict with patient safety and should not necessarily be equated with professional competence in the count procedure.

Speed in conducting the surgical count was regarded as a demonstration of nursing competence, and something to which junior, inexperienced, operating room nurses aspired but it was unusual for a dedicated time, in which surgery stopped, to be devoted to the count. It was more usual that surgery continued while the nurses conducted the count, sometimes acting in the dual role of instrument nurse and surgical assistant. It was not uncommon for the patient to have left the operating room before an instrument count was complete.

To avoid this conflict in the use of time, and to increase surgeon accountability, not passing the skin closure suture or staples until the count is complete could be encouraged as a routine practice to improve patient safety. Doing so, however, would mean that different aspects of safety would be competing for priority: reduced anaesthetic time and possible environmental contamination of the wound would conflict with more rigorous conduct of the surgical count. Hence, what seems to be a straightforward clinical task, the surgical count, involves complex power relationships and competing priorities that can be difficult to implement in the clinical setting.

Limitations of the study

Although this study was undertaken using nurses as key informants, the perspectives of other members of the surgical team, such as surgeons, anaesthetists and technicians, could shed further light on how power relationships affect surgical outcomes. Furthermore, the results of this work were derived from a larger study examining communication and power relationships between nurses and surgeons, which involved an ethnographic approach. The researchers focused on communication practices and power relationships in a general sense rather than on the surgical count specifically, which may have reduced the scope of the results. Several rituals and practices exist in relation to counting instruments and sponges, some of which may not be reflected in the results of this study. Nevertheless, for the purposes of this work, the extensive participant observation of nurse–surgeon interactions in three different operating theatres produced illuminating data.

CONCLUSION

Surgeons and nurses must be committed to the common goals of patient safety to ensure that surgical instruments, sponges and sutures are not retained in the patients' surgical wound. There seems little doubt that improving the communication skills among nurses, and between surgeons and nurses, will assist in dealing with patient safety to safeguard against the possibility of retained surgical items. In addition, opportunities for innovation in the conduct of the surgical count should be considered, particularly in light of the fact that since its inception little time and effort has been devoted to developing a more reliable method of checking for retained surgical items other than manual counting. Microchip technology could be incorporated in the design and manufacture of surgical supplies and instruments and, when combined with hand-held imaging technology, would provide a potent patient safety measure to safeguard against the possibility of retained surgical items. An opening is available to those who want to take up the challenge of revolutionising a practice that has remained unchanged for many decades.

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